Appendix C

Oil/Water Separator
Confirmatory Analytical Results
and Data Validation Reports

The following reports are partial reports and do not include the referenced tables confirmatory analytical results as indicated. This information will be provided under separate cover upon request.

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 04/24/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 04/22/02

A Tier II data validation was performed on data for three soil samples collected on April 22, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-123 through WT-CS-04-124. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The sample was submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported this sample under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E204861 (batch 14701).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2002400) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0418-02-02.6. Aroclor 1254 was spiked into the sample at a concentration of 3.05 ug/l. The performance acceptance limit was 1.49-4.15 ug/l. The laboratory reported a concentration of 2.7 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 3°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification is applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

The sample was shipped to Premier Laboratory under chain of custody on 04/22/02. The laboratory received the sample on 04/22/02. The sample was analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. Surrogates were within acceptance limits for other all field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2002397. Aroclor 1254 was spiked into the MS and MSD samples. Percent recoveries and RPD were within acceptance limits. All affected data were qualified as Estimated (J) in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.

Field Duplicate

Samples 2002397 and 2002398 were submitted as a field duplicate pair. The RPD was not calculated since both sets of results were ND<43 for all Aroclors reported.

Acceptable duplicate precision is assumed.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No qualifiers were added to this data set.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Cleary

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 01/07/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/17/01

A Tier II data validation was performed on data for six soil samples collected on December 17, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-110 through WT-CS-04-115. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112646 (batch 12097).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 5.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Seven samples were shipped to Premier Laboratory under chain of custody on 12/17/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for "other" constituents. Validation of PCBs is discussed in this report. The validation of the "other" constituents is discussed under separate cover. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

A matrix spike / matrix spike duplicate was performed on sample 2001505 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

No field duplicates were submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical

error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 01/07/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/17/01

A Tier II data validation was performed on data for six soil samples collected on December 17, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-110 through WT-CS-04-115. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112646 (batch 12097).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 5.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Seven samples were shipped to Premier Laboratory under chain of custody on 12/17/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for "other" constituents. Validation of PCBs is discussed in this report. The validation of the "other" constituents is discussed under separate cover. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

A matrix spike / matrix spike duplicate was performed on sample 2001505 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

No field duplicates were submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical

error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Cleary

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 01/18/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/17/01

A Tier II data validation was performed on data for three soil samples and a trip blank (2001510) collected on December 17, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" paramters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E112646.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain-of-Custody
- Preservation and Holding Time
- GC/MS Instrument Performance Check
- Initial and Continuing Calibration
- Surrogate Compounds
- Internal Standards
- Matrix Spike / Matrix Spike Duplicate
- Laboratory Control Sample
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on December 17, 2001. The laboratory received the samples on December 18, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 5.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001510) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001505. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	59	54	60-142		J	J	Low	2001505

The non-detect result for chloroethane in the unspiked sample was qualified as an estimated result.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

Field Duplicate

A field duplicate was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and

direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 5.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Most target compounds were within acceptance limits for SVOC compounds for the

initial and continuing calibrations. Hexachlorocyclopentadiene and 4-Nitrophenol werer estimated due to high continuing calibration drift. Samples affected are 2001505 and 2001507. Bis(2-Chloroisoproply)Ether was rejected due to low initial RRF, and n-Nitrosodi-n-propylamine was rejected due to low initial curve fit. Sample affected is 2001509.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

All SVOC data met the QC acceptance criteria.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and

retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001505. All data met the QC acceptance criteria.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

Field Duplicate

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

ICP Interference Check Sample

The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.

All data met the QC acceptance criteria.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001505. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate was not submitted with this data set. Field duplicates are submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Arsenic	68.8	80-120	J	UJ	All
Barium	123.5	80-120	J	A	All
Copper	131.1	80-120	J	A	All

Lead	212.9	80-120	J	A	All
Zinc	145.8	80-120	J	A	All

All data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

Matrix Spike

A MS / MSD was performed on sample 2001505 and was within QC acceptance limits for %R and RPD for TPH.

Field Duplicate

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane was qualified as estimated based on low percent recovery for the MS and MSD analyses. Some SVOC results were qualified as estimated based on high continuing calbration drift or low initial RRF / R^2. Chloroethane was qualified as estimated based on low percent recovery for the MS and MSD analyses. Some metal results were qualified as estimated based on low/high percent recovery for the LCS

sample. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Cleary

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 12/15/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/12/01

A Tier II data validation was performed on data for six soil samples collected on December 12, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-104 through WT-CS-04-109. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112477 (batch 12036).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001488) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1207-01-05.1. Aroclor 1254 was spiked into the sample at a concentration of 3.22 ug/l. The performance acceptance limit was 1.65-4.25 ug/l. The laboratory reported a concentration of 3.2 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.3°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Six samples were shipped to Premier Laboratory under chain of custody on 12/12/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for "other" constituents. Validation of PCBs is discussed in this report. The validation of the "other" constituents is discussed under separate cover. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

A matrix spike / matrix spike duplicate was performed on sample 2001481 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

No field duplicates were submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clearey

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
Sample Date: 12/12/01
DV Date: 02/06/02

Project Name: Willow Brook Pond PCB Remediation
DV Report for Other Parameters

A Tier II data validation was performed on data for three soil samples collected on December 12, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E112477.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain-of-Custody
- Preservation and Holding Time
- GC/MS Instrument Performance Check
- Initial and Continuing Calibration
- Surrogate Compounds
- Internal Standards
- Matrix Spike / Matrix Spike Duplicate
- Laboratory Control Sample
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Six soil samples, one trip blank and six performance samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 12, 2002. The laboratory received the samples on January 12, 2002. Three soil samples were selected for "other parameters." During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Seventeen VOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 7.3°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration for VOCs

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within acceptance limits. Chloroethane was outside the continuing calibration acceptance criteria (26 %D). All affected results were qualified accordingly.

Blanks

Blank analyses data is to determine the existence and magnitude of

contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

The method blank was evaluated for contamination for VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All internal standard area counts and retention times were within accpetance limits.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001482 (Batch 12057). The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	49	42	60-142		J	J	Low	2001482
1,1-Dichloroethene	57	43	63-118		J	J	Low	2001482

There were no detects reported in the unspiked sample. All affected data were qualified accordingly.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

The laboratory control samples were within acceptance limits.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on

laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Forty-one SVOCs were spiked into the sample. All PE data were within the vendor-certified acceptance limits.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 7.3°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and

continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All internal standard area counts and retention times were within accpetance limits.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001482. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Fluoranthene				49.6	24	J	J	-	2001482
2-Nitroaniline	0	0	25-100			J	R	Low	2001482
3-Nitroaniline	0	0	17-98			J	R	Low	2001482

All affected data were qualified accordingly.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

The laboratory control samples were within acceptance limits.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Eleven metals were spiked into the sample. The following table summarizes the PE data that were not within vendor-certified acceptance limits:

Compound	Reported Concentration (mg/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
Barium	.55	.486	.434-.538	J	A	High	All samples in data set

All affected data were qualified accordingly.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

ICP Interference Check Sample

The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.

All data met the QC acceptance criteria.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the

sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001482. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Silver	121.5	80-120	J	A	All samples in data set

All data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

All TPH and Cyanide performance data met the vendor certified acceptance criteria.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

Matrix Spike

A MS / MSD was performed on sample 2001482 and was within QC acceptance limits for %R and RPD for TPH.

Field Duplicate

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going

basis.

Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane and 1,1-dichloroethene were qualified as estimated based on low percent recovery for the MS / MSD analyses, Chloroethane was also estimated due to high %D in the continuing calibration. Some SVOC compounds were qualified as estimated or rejected based on low percent recovery or high RPD for the MS/MSD analyses. Silver results were qualified as estimated based on high percent recovery for the LCS. Barium was qualified as estimated unacceptable performance evaluation data. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Christine M. Clearey

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 12/09/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/07/01

A Tier II data validation was performed on data for ten soil samples collected on December 07, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-094 through WT-CS-04-103. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112249 (batch 11866).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001475) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1204-01-03.2. Aroclor 1254 was spiked into the sample at a concentration of 8.14 ug/l. The performance acceptance limit was 4.17-10.7 ug/l. The laboratory reported a concentration of 6.7 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Seventeen samples were shipped to Premier Laboratory under chain of custody on 12/07/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for "other" constituents. Validation of PCBs is discussed in this report. The validation of the "other" constituents is discussed under separate cover. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

A matrix spike / matrix spike duplicate was performed on sample 2001465 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

No field duplicates were submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 01/30/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/701

A Tier II data validation was performed on data for five soil samples and a trip blank (2001474) collected on December 7, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E112249.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain-of-Custody
- Preservation and Holding Time
- GC/MS Instrument Performance Check
- Initial and Continuing Calibration
- Surrogate Compounds
- Internal Standards
- Matrix Spike / Matrix Spike Duplicate
- Laboratory Control Sample
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on December 7, 2001. The laboratory received the samples on December 7, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Nineteen VOCs were spiked into the sample. Benzene was reported at a concentration of 7800 ug/l. The certified acceptance range for benzene was 6.22 – 9.82 ug/l. Since the sample was run at a 50X dilution, the detection limit of all other compounds exceeded the certified value ranges. Premier Laboratory and ERA were requested to perform an investigation of this sample. Unfortunately, the investigation was inconclusive. The PE sample was deemed unusable to qualify any of the VOC samples in this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 6.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001474) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001465. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Chloroethane	39	41	60-142			J	J	Low	2001465
Bromomethane	47	44	50-147			J	J	Low	2001465
1,1-Dichloroethene		25	63-118	107	28	J	J	Low	2001465

The non-detect results in the unspiked sample were qualified as an estimated result.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

Field Duplicate

A field duplicate was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Thrity-nine SVOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 6.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001465. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Fluoranthene				34.7	24	J	J	Non-directional	2001465

The results in the unspiked sample were qualified as an estimated result.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

Field Duplicate

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going

basis.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Ten metals were spiked into the sample. All PE data were within vendor-certified acceptance limits.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

ICP Interference Check Sample

The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.

All data met the QC acceptance criteria.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001465. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate was not submitted with this data set. Field duplicates are submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Silver	66.1	80-120	J	UJ	All
Arsenic	49.8	80-120	J	UJ	All
Lead (SPLP)	155.2	80-120	J	A	All

All data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

All performance data met the vendor certified acceptance criteria.

Preservation and Holding Times

All samples analyzed for TPH were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

Matrix Spike

A MS / MSD was performed on sample 2001435 and was within QC acceptance limits for %R and RPD for TPH.

Field Duplicate

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane and Bromomethane were qualified as estimated based on low percent recovery for the MS / MSD analyses. 1,1-Dichloroethene was qualified as estimated due to high % RPD / low % recovery in the MSD analysis. Fluoranthene was qualified as estimated due to high % RPD in the MSD analysis. Some metal results were qualified as estimated based on low percent recovery for the LCS sample. A

description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To:	Brian Cutler / LEA
From:	Tina Clemmey / LEA
DV Report Date:	01/21/02
Project Name:	Willow Brook Pond PCB Remediation
Sampled Date:	12/05/01

A Tier II data validation was performed on data for sixteen soil samples collected on December 05, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-080 through WT-CS-04-093. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112129 (batch 11818).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001458) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1204-01-03.1. Aroclor 1254 was spiked into the sample at a concentration of 6.11 ug/l. The performance acceptance limit was 3.13-8.06 ug/l. The laboratory reported a concentration of 5.2 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 11°C, which was outside the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour. Since the process from sample collection to receipt at the laboratory happens over a short time period, the ambient temperature samples do not have sufficient time to reach 4°C. This issue does not impact data usability.

Agreement with the Chain of Custody

Eighteen samples were shipped to Premier Laboratory under chain of custody on 12/05/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for "other" constituents. Validation of PCBs is discussed in this report. The validation of the "other" constituents is discussed under separate cover. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

A matrix spike / matrix spike duplicate was performed on sample 2001442 with this data set. Percent recovery and relative percent difference were within acceptance limits for the MS. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

Samples 2001444 / 2001445 and 2001448 / 2001449 were submitted as field duplicate pairs. The RPD for 2001444 / 2001445 was 67%, which was not within the acceptance criteria (less than 50% for samples greater than 2 times the detection limit). The sample results were estimated. The RPD for 2001448 / 2001449 was 7%, which was within acceptance criteria for field duplicate precision for soil samples.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Aroclor 1254 for samples 2001444 and 2001445 were estimated due to high field duplicate RPD.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clemmey

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 01/30/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/5/01

A Tier II data validation was performed on data for nine soil samples and a trip blank (2001457) collected on December 5, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E112129.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain-of-Custody
- Preservation and Holding Time
- GC/MS Instrument Performance Check
- Initial and Continuing Calibration
- Surrogate Compounds
- Internal Standards
- Matrix Spike / Matrix Spike Duplicate
- Laboratory Control Sample
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on December 5, 2001. The laboratory received the samples on December 5, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Seventeen VOCs were spiked into the sample. The following table summarizes the the PE data that were not within vendor-certified acceptance limits:

Compound	Reported Concentration (ug/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
Tetrachloroethylene	61	50.3	38.5-59.3	J	A	High	All samples in data set
Trichloroethylene	30	24.8	18.9-29.5	J	A	High	All samples in data set

All affected data were qualified accordingly.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 11.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for

each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001457) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001442. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Chloroethane	47	48	60-142			J	J	Low	2001442

The non-detect results in the unspiked sample were qualified as an estimated result.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

Field Duplicate

Samples 2001444 / 2001445 were submitted as field duplicate pair. The RPD for 2001444 / 2001445 were not calculated since both results were non-detect.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Forty-two SVOCs were spiked into the sample. ERA had originally sent the wrong acceptance values; but after being notified, the correct limits were re-sent. The following table summarizes the PE data that were not within the correct vendor-certified acceptance limits:

Compound	Reported Concentration (ug/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
1,2,4-Dichlorobenzene	50	114	50.4-118	J	J	Low	All samples in data set
2,4,5-Trichlorophenol	73	147	75.6-165	J	J	Low	All samples in data set

Compound	Reported Concentration (ug/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
4-Chlorophenyl Phenyl Ether	48	95.2	50.4-107	J	J	Low	All samples in data set
Anthracene	47	91.1	47.2-104	J	J	Low	All samples in data set
Benzo(a)anthracene	22	42.7	28.3-46	J	J	Low	All samples in data set
Benzo(b)fluoranthene	25	57.6	27.2-70.1	J	J	Low	All samples in data set
Bis(2-chloroethoxy) Methane	18	47.2	24.9-50.8	J	J	Low	All samples in data set
Chrysene	32	60.3	33.5-69.7	J	J	Low	All samples in data set
Di-n-butyl Phthalate	20	37.6	20.7-47.8	J	J	Low	All samples in data set
Fluorene	22	42.2	24.1-48.7	J	J	Low	All samples in data set
Nitrobenzene	28	56.8	28.6-64.8	J	J	Low	All samples in data set
Phenanthrene	28	53.5	32.6-60.7	J	J	Low	All samples in data set

All affected data were qualified accordingly. It should be noted that some of the SVOC performance data were reported very close to the lower acceptance limit. If rounding were applied some of the compounds that were qualified as estimated may be considered a pass. Since several SVOC compounds were outside acceptance limits and not all were at the lower acceptance limit, the validator chose to qualify the data versus the acceptance limits exactly as reported without applying any rounding up of

the actual concentrations reported.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 11.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and retention times. Perylene-d12 was outside the acceptance limits (low area count) for sample 2001442MS. All affected data were qualified.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001442. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Hexachlorocyclopentadiene				200	41	J	J	High	2001442

The results in the unspiked sample were qualified as an estimated result.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

Field Duplicate

Samples 2001444 / 2001445 were submitted as field duplicate pair. The RPD for 2001444 / 2001445 were not calculated since both results were non-detect.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Ten metals were spiked into the sample. All PE data were within vendor-certified acceptance limits.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

ICP Interference Check Sample

The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.

All data met the QC acceptance criteria.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001442. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses. The following table summarizes MS/MSD data that did not meet

acceptance criteria:

Analyte	%R (MS)	%R (MSD)	%R QC Range	Detects	Non-detects	Samples Affected
Barium (SPLP)		180%	75-125	J	A	All samples in data set
Zinc(SPLP)	206.6%	208.8%	75-125	J	A	All samples in data set

All affected data were qualified accordingly.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

Samples 2001444 / 2001445 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	**Sample # 2001444**	**Duplicate # 2001445**	**RPD**	**Action**	**Affected Samples**
Nickel (SPLP)	ND	.038	NC	A	2001444, 2001445
Arsenic	1.6	1.5	6%	A	2001444, 2001445

Barium	27	37	31%	A	2001444, 2001445
Cadmium	ND	1.8	NC	J	2001444, 2001445
Chromium	7.2	43	143%	J	2001444, 2001445
Copper	5.3	15	96%	J	2001444, 2001445
Lead	7.3	18	85%	J	2001444, 2001445
Nickel	8.0	40	133%	J	2001444, 2001445
Silver	ND	.99	NC	J	2001444, 2001445
Zinc	19	24	23%	A	2001444, 2001445
Mercury	.034	.026	27%	A	2001444, 2001445

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for nickel (SPLP), arsenic, barium, zinc, and mercury. The RPD was not calculated (NC) for cadmium or silver, however, the results were qualified since one result was less than the detection limit and the other results was greater than two times the detection limit.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Silver	128.1	80-120	J	A	All
Lead	179.8	80-120	J	A	All
Mercury (SPLP)	129.2	80-120	J	A	All

Mercury was the only compound with LCS data. No other compounds were available. All data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

All performance data met the vendor certified acceptance criteria.

Preservation and Holding Times

All samples analyzed for TPH were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance

criteria for the blanks were acceptable.

Matrix Spike

A MS / MSD was performed on sample 2001435 and was within QC acceptance limits for %R and RPD for TPH.

Field Duplicate

Samples 2001444 / 2001445 were submitted as field duplicate pair. The RPD for 2001444 / 2001445 were not calculated since both results were non-detect.

Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane was qualified as estimated based on low percent recovery for the MS / MSD analyses. Some SVOC compounds were qualified as estimarted due to unacceptable performance evaluation data. Hexachlorocyclopentadiene was qualified as estimated due to high % RPD in the MSD analysis. Some metal results were qualified as estimated based on high percent recovery for the field duplicate precision. Some metal results were qualified as estimated based on low / high percent recovery

for the LCS sample. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 12/05/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/03/01

A Tier II data validation was performed on data for eighteen soil samples collected on December 03, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-064 through WT-CS-04-079. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112023 (batch 11735).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001428) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1129-01-02.1. Aroclor 1254 was spiked into the sample at a concentration of 1.93 ug/l. The performance acceptance limit was 0.988-2.55 ug/l. The laboratory reported a concentration of 2.0 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 16°C, which was outside the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour. Since the process from sample collection to receipt at the laboratory happens in a relatively short time period, the ambient temperature samples do not have sufficient time to reach 4°C. This issue does not impact data usability.

Agreement with the Chain of Custody

Two samples were shipped to Premier Laboratory under chain of custody on 12/03/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for "other" constituents. Validation of PCBs is discussed in this report. The validation of the "other" constituents is discussed under separate cover. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

A matrix spike / matrix spike duplicate was performed on sample 2001410 with this data set. Percent recovery and relative percent difference were within acceptance limits.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

Samples 2001414 / 2001415 and 2001418 / 2001419 were submitted as field duplicate pairs. The RPD for 2001414 / 2001415 was not calculated since both results were non-detect. The RPD for 2001418 / 2001419 was 46%, which was within acceptance criteria for field duplicate precision for soil samples.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clearey

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To:	Brian Cutler / LEA
From:	Tina Clemmey / LEA
DV Report Date:	02/05/02
Project Name:	Willow Brook Pond PCB Remediation
Sampled Date:	12/3/01

A Tier II data validation was performed on data for nine soil samples and a trip blank (2001427) collected on December 3, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E112023.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain-of-Custody
- Preservation and Holding Time
- GC/MS Instrument Performance Check
- Initial and Continuing Calibration
- Surrogate Compounds
- Internal Standards
- Matrix Spike / Matrix Spike Duplicate
- Laboratory Control Sample
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on December 3, 2001. The laboratory received the samples on December 3, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Seventeen VOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 16.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations. Chloroethane was outside the initial calibration acceptance limits with 35.7%RSD. All affected data were qualified accordingly.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001427) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs with the exception of 2001410MS. No qualifications was applied to the unspiked sample based on poor surrogate recovery in the matrix spike sample.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001410. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Chloroethane	49	43	60-142			J	J	Low	2001410

The non-detect results in the unspiked sample were qualified as an estimated result.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

Field Duplicate

Samples 2001414 / 2001415 were submitted as field duplicate pair. The RPD for 2001414 / 2001415 were not calculated since both results were non-detect.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and

direction of the quantitative bias.

Forty SVOCs were spiked into the sample. All PE data were within the vendor-certified acceptance limits.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 16.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All target compounds were within acceptance limits for SVOC compounds for the

initial and continuing calibrations. Hexachlorocyclopentadiene was ouside the continuing calibration acceptance limits (32.0%D). All affected data were qualified accordingly.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001410. All data met the QC acceptance criteria.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

Field Duplicate

Samples 2001414 / 2001415 were submitted as field duplicate pair. The RPD for 2001414 / 2001415 were not calculated since both results were non-detect.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Ten metals were spiked into the sample. All PE data were within vendor-certified acceptance limits.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

ICP Interference Check Sample

The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.

All data met the QC acceptance criteria.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001410. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses. The following table summarizes MS/MSD data that did not meet acceptance criteria:

Analyte	%R (MS)	%R (MSD)	%R QC Range	Detects	Non-detects	Samples Affected
Barium (SPLP)	142.9%	143.2%	75-125	J	A	All samples in data set
Zinc(SPLP)	132.1%	131.4%	75-125	J	A	All samples in data set

All affected data were qualified accordingly.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

Samples 2001414 / 2001415 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	**Sample # 2001414**	**Duplicate # 2001415**	**RPD**	**Action**	**Affected Samples**
Arsenic	ND	1800	NC	J	2001414, 2001415
Barium	15000	14000	7%	A	2001414, 2001415
Chromium	4200	3800	10%	A	2001414, 2001415

Copper	4500	4200	7%	A	2001414, 2001415
Lead	2200	2000	10%	A	2001414, 2001415
Nickel	8900	9900	11%	A	2001414, 2001415
Zinc	15000	14000	7%	A	2001414, 2001415

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for all metal compounds. The RPD was not calculated (NC) for arsenic, however, the results were qualified since one result was less than the detection limit and the other results was greater than two times the detection limit.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Cadmium	18.6	80-120	J	UJ	All
Selenium	75.4	80-120	J	UJ	All
Mercury (SPLP)	129.2	80-120	J	A	All

Mercury was the only compound with LCS (SPLP) data. No other (SPLP)

compounds were available. All data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

The following table summarizes performance data that did not meet vendor certified acceptance criteria:

Compound	Reported Concentration (mg/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
TPH	79	63.1	37.9-78.9	J	A	High	All samples in data set

All data were qualified accordingly.

Preservation and Holding Times

All samples analyzed for TPH were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

Matrix Spike

A MS / MSD was performed on sample 2001435 and was within QC acceptance limits for %R and RPD for TPH.

Field Duplicate

Samples 2001414 / 2001415 were submitted as field duplicate pair. The RPD for 2001414 / 2001415 were not calculated since both results were non-detect.

Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane was qualified as estimated based on low percent recovery for the MS / MSD analyses. Chloroethane was also estimated due to high initial calibration %RSD. Arsenic was qualified as estimated based on high percent recovery for the field duplicate precision. Some metal results were qualified as estimated based on low percent recovery for the LCS sample. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clearey

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 12/05/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 12/03/01

A Tier II data validation was performed on data for eighteen soil samples collected on December 03, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-04-064 through WT-CS-04-079. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112023 (batch 11735).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001428) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1129-01-02.1. Aroclor 1254 was spiked into the sample at a concentration of 1.93 ug/l. The performance acceptance limit was 0.988-2.55 ug/l. The laboratory reported a concentration of 2.0 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 16°C, which was outside the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour. Since the process from sample collection to receipt at the laboratory happens in a relatively short time period, the ambient temperature samples do not have sufficient time to reach 4°C. This issue does not impact data usability.

Agreement with the Chain of Custody

Two samples were shipped to Premier Laboratory under chain of custody on 12/03/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for "other" constituents. Validation of PCBs is discussed in this report. The validation of the "other" constituents is discussed under separate cover. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

A matrix spike / matrix spike duplicate was performed on sample 2001410 with this data set. Percent recovery and relative percent difference were within acceptance limits.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

Samples 2001414 / 2001415 and 2001418 / 2001419 were submitted as field duplicate pairs. The RPD for 2001414 / 2001415 was not calculated since both results were non-detect. The RPD for 2001418 / 2001419 was 46%, which was within acceptance criteria for field duplicate precision for soil samples.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 11/8/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 11/6/01

A Tier II data validation was performed on data for thirty-four confirmational soil samples collected on November 6, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A performance evaluation sample (2001270). Samples were collected from locations of the Site designated as WT-CS-04-021 through WT-CS-04-057. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E111120. Samples 2001234 through 2001253 were analyzed within the analytical batch 11316. Samples 2001254 through 2001267 were analyzed within the analytical batch 111326. The performance evaluation sample (2001270) was analyzed with batch 11333.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where

applicable

The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001270) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1102-01-05.1 (65010). Aroclor 1254 was spiked into the sample at a concentration of 2.86 ug/l. The performance acceptance limit was 1.71-3.59 ug/l. The laboratory reported a concentration of 2.4 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

All soil samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20% with the exception of one of the three peaks (PK2) on GC 8, which was reported as 23.1%. The average %RSD was less than 20% for this standard. QC acceptance criteria were met for the initial calibration.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001234. Aroclors 1016 and 1260 were spiked into the field sample. One peak for 1016 (PK2) in the MSD was above the acceptance range for % Recovery. The laboratory control sample associated with sample was in control; all surrogates were in control in unspiked sample, the MS and the MSD. All Aroclor results in the unspiked sample were reported as non-detect. The results of the unspiked sample were accepted as reported.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001254. Aroclors 1016 and 1260 were spiked into the field sample. The spike concentration was diluted out and therefore the %R and RPD cannot be evaluated. The concentration in the unspiked sample was 1900 ug/kg. The surrogates in the unspiked sample, the MS and the MSD were in control. The laboratory control sample was in control. The results of the unspiked sample were accepted as reported.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

Samples 2001244 and 2001245 were submitted as a field duplicate pair with this data set. Aroclor 1254 was reported in sample 2001244 at 3700 ug/kg. Aroclor 1254 was reported in sample 2001245 at ND<46 ug/kg. The relative percent difference (RPD) between results that are not greater than two times the reporting limit are generally not calculated since there is greater variability near the detection limit. However, the results in this case were qualified as estimated (J) based on poor field duplicate precision. Technical judgement was used to qualify the results on the basis that one result was less than the reporting limit and the other result approximately 75 times the reporting limit, which equates to approximately an RPD of 200%.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Results for samples 2001244 and 2001245 were qualified as estimated (J) based on poor field duplicate precision.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To:	Brian Cutler / LEA
From:	Tina Clemmey / LEA
DV Report Date:	02/06/02
Project Name:	Willow Brook Pond PCB Remediation
Sampled Date:	11/06/01

A Tier II data validation was performed on data for sixteen samples and a trip blank (2001269) collected on November 6, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E111120.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain-of-Custody
- Preservation and Holding Time
- GC/MS Instrument Performance Check
- Initial and Continuing Calibration
- Surrogate Compounds
- Internal Standards
- Matrix Spike / Matrix Spike Duplicate
- Laboratory Control Sample
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on November 6, 2001. The laboratory received the samples on November 6, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 6.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001269) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil samples 2001235 and 2001259. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Bromomethane	29	27	50-147			J	UJ	Low	2001259
Chloroethane	30	30	60-142			J	UJ	Low	2001259
1,1-Dichloroethene		33	63-118	64	28	J	UJ	Low	2001259
Chloroethane	44	40	60-142			J	UJ	Low	2001235

The results in the unspiked sample were qualified as estimated.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

Field Duplicate

Samples 2001243 / 2001245 were submitted as field duplicate pair. The RPD for 2001243 / 2001245 were not calculated since both results were non-detect.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 6.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations, with the exception of Bis(2-chloroisopropyl) Ether, which was outside the continuing calibration acceptance criteria (26.9%D). All affected data were qualified accordingly.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by

assessing internal standard area count recovery and retention time drift.

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001235. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Bis(2-chloroethyl) ether				40	39	J	J	-	2001235
Hexachlorocyclopentadiene				58	41	J	J	-	2001235

The results in the unspiked sample were qualified as an estimated result.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

Field Duplicate

Samples 2001243 / 2001245 were submitted as field duplicate pair. The RPD for 2001243 / 2001245 were not calculated since both results were non-detect.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on

laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

ICP Interference Check Sample

The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.

All data met the QC acceptance criteria.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001235. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Silver	71.3	71.7	75-125			J	UJ	Low	2001235
Nickel	54.0	54.3	75-125			J	UJ	Low	2001235
Lead	63.6	64.4	75-125			J	UJ	Low	2001235
Cyanide	67.7		75-125			J	UJ	Low	2001235

All affected data were qualified accordingly.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

Samples 2001243 / 2001245 were submitted as field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001243	Duplicate # 2001245	RPD	Action	Affected Samples
Barium	13	16	21%	A	2001243, 2001245
Chromium	5.3	5.3	0%	A	2001243, 2001245
Copper	4.3	4.1	5%	A	2001243, 2001245
Lead	3.2	3.3	3%	A	2001243, 2001245
Nickel	6.1	13	72%	J	2001243, 2001245
Zinc	15	13	14%	A	2001243, 2001245

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for all compounds except Nickel.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Chromium	167.9	80-120	J	A	All

All data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

Matrix Spike

A MS / MSD was performed on sample 2001235 and was within QC acceptance limits for %R and RPD for TPH.

Field Duplicate

Samples 2001243 / 2001245 were submitted as field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001243	Duplicate # 2001245	RPD	Action	Affected Samples
TPH	ND	220	NC	A	2001243, 2001245

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. The RPD was not calculated (NC) for TPH. The results were not qualified since the result in sample 2001245 was not greater than 2 times the detection limit. The results were within QC acceptance limits.

Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data

usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane was qualified as estimated for sample 2001235, based on low percent recovery for the MS and MSD analyses. Chloroethane, Bromomethane and 1,1-Dichloroethene were qualified as estimated for sample 2001259, based on low percent recovery / high RPD for the MS and MSD analyses. Some SVOC compounds were qualified as estimated due to high RPD in the MS / MSD analyses. Bis(2-chloroisopropyl) Ether was estimated due to high continuing calibration drift. Silver, nickel, and lead results were qualified as estimated based on low percent recovery for the MS / MSD analyses. Nickel was qualified as estimated due to high field duplicate precision. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 11/28/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 11/26/01

A Tier II data validation was performed on data for one confirmational concrete sample collected on November 26, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample was collected from locations of the Site designated as WT-CS-04-063. The sample was analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E111A11. Sample 2001319 was analyzed within the analytical batch 11587.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The concrete sample was extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 3.9°C, which was within the acceptance limit of 4°C +/- 2°C.

Agreement with Chain of Custody

According to the chain of custody, sample 2001319 was shipped to Premier laboratory on November 26, 2001. Only PCBs were requested on the chain of custody. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

An initial calibration curve was performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%. QC acceptance criteria were met for the initial calibration.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration

target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in the field sample, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001319. Aroclors 1016 and 1260 were spiked into the field sample. High % recoveries were reported for Aroclors 1016 and 1260 for both the MS and the MSD analyses on both columns #1 and #2. A concentration of Aroclor 1254 was reported at 990 ug/kg in the unspiked sample. All surrogates were in control for the unspiked sample, the MS and the MSD analyses. The associated laboratory control sample was in control. The results of the unspiked sample were accepted as reported.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

A field duplicate was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

All data were accepted as reported.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Cleary

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 11/8/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 11/6/01

A Tier II data validation was performed on data for one confirmational soil sample collected on November 6, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample was collected from locations of the Site designated as WT-CS-04-058. The sample was analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E111261. Sample 2001268 was analyzed within the analytical batch 11327.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A performance evaluation sample was not analyzed with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

All soil samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 8°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature based on the logistics between the site and the laboratory.

Agreement with Chain of Custody

According to the chain of custody, sample 2001268 was shipped on November 17, 2001. The laboratory reported analytical results for sample 2002168. The field sampling form was reviewed in conjunction with a telephone call to the field sampler to verify the correct sample number. It was determined that the laboratory inadvertently transcribed the wrong sample number. The laboratory Form I and the electronic deliverable file was amended and resubmitted. This issue did not impact data usability.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20% with the exception of one of the three peaks (PK2) on GC 8, which was reported as 23.1%. The average %RSD was less than 20% for this standard. QC acceptance criteria were met for the initial calibration.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001268. Aroclors 1016 and 1260 were spiked into the field sample. The spike concentration was diluted out and therefore the %R and RPD could not be evaluated. The concentration in the unspiked sample was 3100 ug/kg. The surrogates in the unspiked sample, the MS and the MSD were in control. The laboratory control sample was in control. The results of the unspiked sample were accepted as reported.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

A field duplicate was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No qualification was applied to the data for sample 2001268.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified Remedial Action Work Plan have been met.

Christine M. Cleary

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 11/06/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 11/05/01

A Tier II data validation was performed on data for thirteen confirmational soil samples collected on November 5, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Samples were collected from locations of the Site designated as WT-CS-04-014 through WT-CS-04-025. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E111158. All samples were analyzed within the analytical batch 11278.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

All soil samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.9°C, which exceeds the acceptance limit of 4°C +/- 2°C. Samples were not qualified based on temperature because of the logistics of the courier process. In many cases during this project, the courier was waiting to transport samples as the field sampler was collecting the samples. The samples were placed into the cooler at ambient temperature. The trip from the Site to

the laboratory was approximately 45 minutes, which was not enough time for the samples to be cooled to 4°C. No qualification was applied based on sample temperature.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

An initial calibration curve was performed using equal concentrations of a mixture of Aroclors 1016 and 1260. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%. QC acceptance criteria were met for the initial calibration.

A continuing calibration verification consisting of a mixture of Aroclors 1016 and 1260 was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every

sample. QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001221. Aroclors 1016 and 1260 were spiked into the field sample. All QC acceptance criteria were met for percent recovery (%R) and relative percent difference (RPD).

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS compounds (Aroclors 1016 and 1260).

Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality

Objectives (DQOs) and resultant "total error" of the data.

All QC acceptance criteria were met for this data set. No qualifiers were applied to the data.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified Remedial Action Work Plan have been met.

Christina M. Clearney

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 10/31/01

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 10/30/01

A Tier II data validation was performed on data for fourteen confirmational soil samples collected on October 30, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Samples were collected from locations of the Site designated as WT-CS-04-001 through WT-CS-04-013. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E110D62. All samples were analyzed within the analytical batch 11139.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

All soil samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 11.7°C, which exceeds the acceptance limit of 4°C +/- 2°C. Samples were not qualified based on temperature because of the logistics of the courier process. In many cases during this project, the courier was waiting to transport samples as the field sampler was collecting the samples. The samples were then placed into the cooler at ambient temperature. In addition, the trip

from the Site to the laboratory was approximately 45 minutes, which was not enough time for the samples to be cooled to 4°C. No qualification was applied based on sample temperature.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

An initial calibration curve was performed on GC4 on 10/27/01 at 16:13 and 17:41 and on GC8 on 10/31/01 at 10:03 and 11:16. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%. QC acceptance criteria were met for the initial calibration.

A continuing calibration verification was performed on GC4 on 10/31/01 at 12:30, 15:34 and 17:59 and on GC8 on 10/31/01 at 15:50 and 21:20. The standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for PCBs. Surrogates were diluted out for samples 2001210 (Aroclor 1254: 6400 ug/kg) and 2001216 (Aroclor 1254: 4000 ug/kg). Both samples were performed with a 20 X dilution factor.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001207. Aroclors 1016 and 1260 were spiked into the field sample. All QC acceptance criteria were met for percent recovery (%R) and relative percent difference (RPD).

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS compounds (Aroclors 1016 and 1260).

Field Duplicate

Samples 2001216 and 2001217 were submitted as a field duplicate pair with this data set. Aroclor 1254 was reported in sample 2001216 at 4000 ug/kg. Aroclor 1254 was reported in sample 2001217 at 5200 ug/kg. The relative percent difference (RPD) between the results was 26%. Acceptable duplicate precision for duplicate soil samples is less than 50%. No qualification was necessary.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

All QC acceptance criteria were met for this data set. No qualifiers were applied to the data.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified Remedial Action Work Plan have been met.

Christina M. Cleary

Authorized Pratt & Whitney Representative